On-scene Investigation / Vehicle to Vehicle
Dynamic Science, Inc. / Case Number: DS99015
1998 Chevrolet Blazer
Arizona
January 1999

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The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points be coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems.

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16. Abstract

This crash occurred in January 1999 at 1948 hours in the state of Arizona. This was an intersection type crash. The case vehicle, a 1998 Chevrolet Blazer 4x4 two-door utility driven by a 27-year-old male 185 cm/75 kg (73 in./165 lbs.), was traveling westbound at a driver reported speed of 64 km/h (40 mph). The front right seat was occupied by a pregnant 21-year-old female 163 cm/82 kg (64 in./180 lbs.). She was in the 34th week of her pregnancy. She indicated that she was wearing her seatbelt–with the lap portion having been placed on her lower hips. Prior to the crash, she was facing toward the middle of the vehicle–as opposed to straight ahead. The seat had been adjusted to the full rearward position. The rear right seat position was occupied by a 10-month-old female. This occupant was seated in a forward facing Evenflo child safety seat.

The other vehicle, a 1998 Honda Civic 2-door sedan driven by a 16-year-old male, was initially traveling westbound. This vehicle made a right hand turn in the intersection to go north, then initiated a U-turn. After completing the U-turn, this vehicle attempted to turn right to continue toward the west. The other vehicle ran the stop sign and entered the intersection.

The driver of the case vehicle saw the other vehicle and began braking. The right front of the case vehicle (CDC=01FREE2) struck the front left side of the other vehicle. Both front air bags in the case vehicle deployed at this point. The case vehicle was pushed into a slight clockwise rotation and came to rest in the western leg of the intersection facing northwest. The other vehicle was pushed into a sharp clockwise direction and came to rest in the western leg of the intersection facing northeast.

The driver of the case vehicle apparently sustained a minor whiplash-type injury. The rear right occupant of the case vehicle did not sustain any injuries
The front right occupant of the case vehicle sustained an eventual abruption of the placenta, contusions to both knees, and contusions to the upper chest. This occupant broke her water immediately after the crash. She was transported to a local hospital by ground ambulance. She was hospitalized for three days. As of the date of this report (27 days after the crash), the pregnancy was continuing normally. The placental abruption seems to have been caused by seat belt loading and possibly some response to her eventual movement to the right. Given that there were visible contusions to her upper chest, and none to her abdomen, it would seem likely that the air bag was not involved to any great extent.

Both vehicles were towed from the scene due to damage. Vehicle 1 was subsequently torn down and repaired.

17. Key Words	18. Distribution Statement
Air bag, deployment, injury, accident, pregnancy, passenger, remote investigation	

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No of pages	22. Price

Dynamic Science, Inc.
Accident Investigation
Case Number: DS99015

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BACKGROUND:

Description:	This case was initiated in response to a report of a passenger air bag deployment which induced an abruption of the placenta in a 21-year-old female occupant. This case is being conducted as a remote investigation. The case vehicle has been torn down and repaired. NHTSA was notified via the GES site. DSI was notified on February 9, 1999.
Investigation Type:	Remote
Crash Location:	Arizona
Crash Date:	January 1999
Notification Date:	February 9, 1999
Field Work Completed:	NA

SUMMARY:

Figure 1. Exterior, case vehicle

This crash occurred in January 1999 at 1948 hours in the state of Arizona. This was an intersection type crash. The case vehicle, a 1998 Chevrolet Blazer 4x4 two-door utility driven by a 27-year-old male 185 cm/75 kg (73 in./165 lbs.), was traveling westbound at a driver reported speed of 64 km/h (40 mph). The front right seat was occupied by a pregnant 21-year-old female 163 cm/82 kg (64 in./180 lbs.). She was in the 34th week of her pregnancy. She indicated that she was wearing her seatbelt–with the lap portion having been placed on her lower hips. Prior to the crash, she was facing toward the middle of the vehicle–as opposed to straight ahead. The seat had been adjusted to the full rearward position. The rear right seat position was occupied by a 10-month-old female. This occupant was seated in a forward facing Evenflo child safety seat.

The other vehicle, a 1998 Honda Civic 2-door sedan driven by a 16-year-old male, was initially traveling westbound. This vehicle made a right hand turn in the intersection to go north, then initiated a U-turn. After completing the U-turn, this vehicle attempted to turn right to continue toward the west. The other vehicle ran the stop sign and entered the intersection.

The driver of the case vehicle saw the other vehicle and began braking. The right front of the case vehicle (CDC=01FREE2) struck the front left side of the other vehicle. The case vehicle sustained a longitudinal delta v of -13.9 km/h (-8.6 mph) and a lateral delta v of -8.0 km/h (-5.0 mph)[1]. Both front air bags in the case vehicle deployed at this point. The case vehicle was pushed into a slight clockwise rotation and came to rest in the western leg of the intersection facing northwest. The other vehicle was pushed into a sharp clockwise direction and came to rest in the western leg of the intersection facing northeast.

The driver of the case vehicle apparently sustained a minor whiplash-type injury. The rear right occupant of the case vehicle did not sustain any injuries

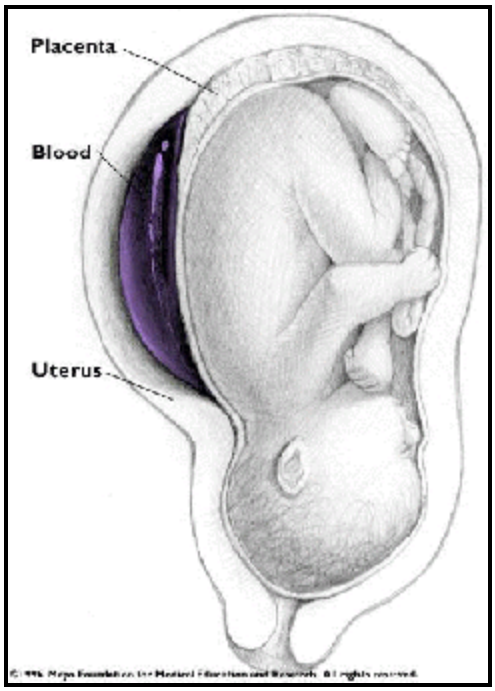

Figure 2. Placental Abruption

The front right occupant of the case vehicle sustained an eventual abruption of the placenta, contusions to both knees, and contusions to the upper chest. This occupant broke her water immediately after the crash. Per EMS personnel, she was having some vaginal bleeding at the scene. She was transported to a local hospital by ground ambulance. She was hemodynamically stable while en route to the hospital, but was complaining of mild lower abdominal pain. She indicated that the bleeding was seat belt related. An examination upon arrival at the hospital revealed the fetal heart tones of an active baby. An ultrasound was performed, but this did not reveal any evidence of an abruption[2]. However, because of the vaginal bleeding and contractions the physicians indicated she had indeed had a placental abruption.

The front right occupant of Vehicle 1 was transfused with two units of packed blood cells and eventually cleared by the trauma team and taken to Labor and Delivery for further observation and management. She continued to have uterine contractions during the remainder of the first day. On the second day of her admittance, she had discontinued bleeding and contracting. There was no evidence of ongoing hemorrhage and she was placed on bed rest and observation. On the third day, she did not have any complaints and denied any uterine contractions or any vaginal bleeding. She was dismissed on that day. As of the date of this report (27 days after the crash), the pregnancy was

[1]Calculated using WinSmash, barrier option, CDC only, not coded in EDCS

[2]A placental abruption is an emergent third trimester complication that results from the hemorrhage and accumulation of blood between the placenta and the wall of the uterus. This inevitably interferes with fetal oxygenation and often necessitates the need for emergency cesarean section delivery.

continuing normally.

Both vehicles were towed from the scene due to damage. Vehicle 1 was subsequently torn down and repaired.

The driver of Vehicle 2 was cited for failing to stop at the stop sign.

Scene Diagram

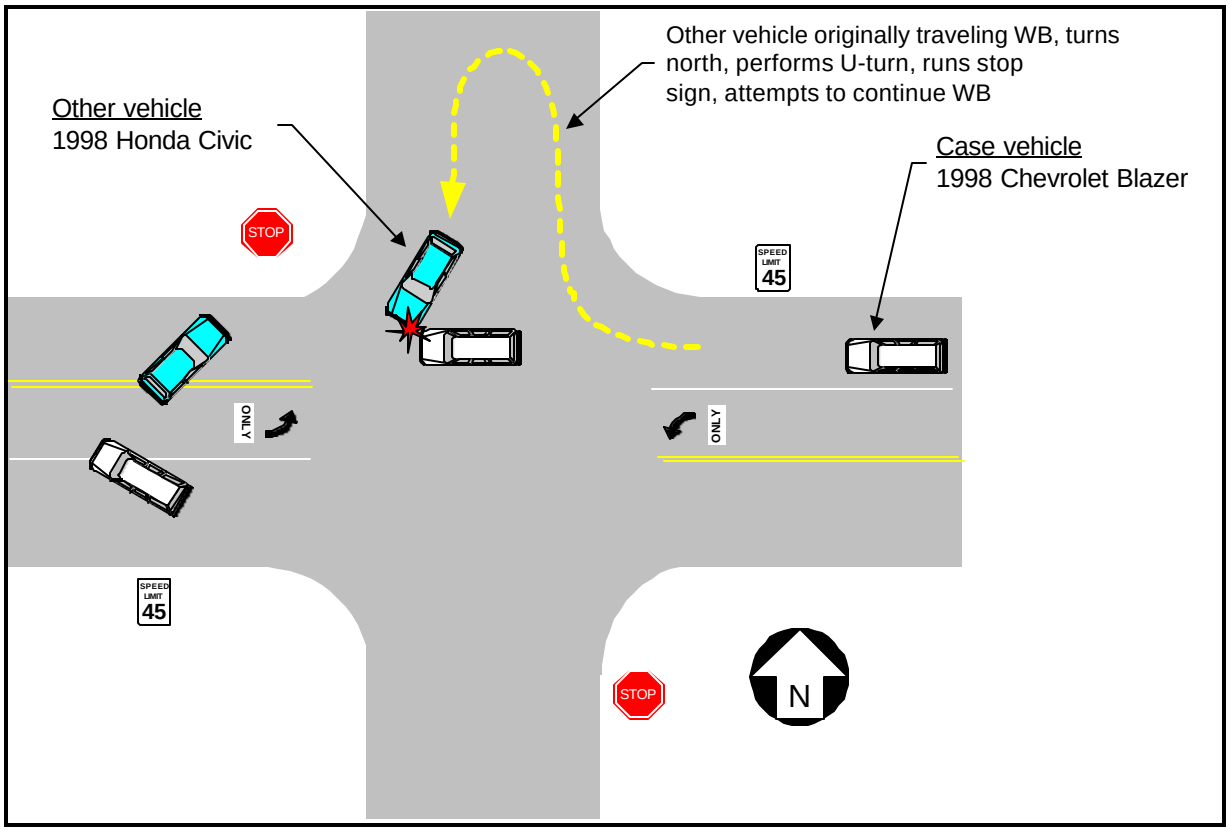

Figure 3. Scene diagram

DETAILED INFORMATION

Vehicles

Case vehicle

Description:	1998 Chevrolet Blazer 4x4 two-door utility	
VIN:	1GNCT18W3WKxxxxxx	
Odometer:	Unknown	
Engine:	4.3 L V6	
Reported Defects:	None	
Cargo:	None	
Damage Description:	Moderate front to rear crush on right front corner. Wheelbase likely shortened.	
CDC:	01FREE2	
Delta V:	Total	Unknown
	Longitudinal	Unknown
	Latitudinal	Unknown
	Energy	Unknown

Figure 6. Close up of damage

Figure 5. Exterior, case vehicle (front view)

Other vehicle

Description:	1998 Honda Civic 2-door	
VIN:	1HGEJ722XWLxxxxxx	
Odometer:	Unknown	
Engine:	Unknown	
Reported Defects:	None noted	
Cargo:	Unknown	
Damage Description:	Unknown	
CDC:	Unknown	
Delta V:	Total	Unknown
	Longitudinal	Unknown
	Latitudinal	Unknown
	Energy	Unknown

Occupants

Case vehicle	Occupant 1	Occupant 2	Occupant 3
Age/Sex:	27/Male	21/Female	10 month/female
Seated Position:	Front left	Front right	Rear right
Seat Type:	Bucket	Bucket	Bench
Height:	185 cm (73 in.)	163 cm (64 in.)	Unknown
Weight:	75 kg (165 lbs.)	82 kg (180 lbs.)	Unknown
Occupation:	Unknown	Unknown	None
Pre-existing Medical Condition:	None noted	34th week of pregnancy	None noted
Alcohol/Drug Involvement:	None	NA	NA
Driving Experience:	> 10 years	NA	NA
Body Posture:	Normal, upright	Facing toward the middle of the vehicle	Seated in forward facing Evenflo child safety seat
Hand Position:	Unknown	Unknown	NA
Foot Position:	Unknown	Unknown	NA
Restraint Usage:	Lap and shoulder used properly	Lap and shoulder used properly–lap portion placed low on hips	Lap and shoulder used in conjunction with child seat. Child seat harness used.
Air bag:	Deployed	Deployed	NA

Other vehicle

Age/Sex:	16/Male
Seated Position:	Left front
Seat Type:	Bucket with folding back
Height:	Unknown
Weight:	Unknown
Occupation:	Unknown
Pre-existing Medical Condition:	Unknown
Alcohol/Drug Involvement:	None
Driving Experience:	Unknown–presumed to be 1 year or less
Body Posture:	Unknown
Hand Position:	Unknown
Foot Position:	Unknown
Restraint Usage:	Lap and shoulder used

Injuries and Injury Mechanisms

Case vehicle

	INJURY	OIC CODE	ICD-9	SOURCE
Driver:	Neck strain	640278.1,6	847.0	Impact forces
RF Occupant:	Contusions to both knees[3]	890402.1,1 890402.1,2	924.11 924.11	Lower instrument panel
	Contusions to upper chest[3]	490402.1,0	922.1	Air bag
	Placental abruption[4]	543400.3,8	641.20	Seat belt
RR Occupant	Not injured			

Other vehicle

	INJURY	OIC CODE	ICD-9	SOURCE
Driver	Not injured			

[3]Interviewee

[4]ER report/Discharge Summary

Occupant Kinematics

Figure 6. Right front seat position

The front right occupant of the case vehicle was seated in an upright manner, with the lap and shoulder belt on, facing towards the center of the vehicle. As the driver of the case vehicle began braking, the front right occupant began moving forward. She likely began loading the lap portion of the belt with her abdomen. Both knees engaged the lower instrument panel. At impact, the passenger side air bag deployed and this occupant continued moving forward and to the right. This occupant sustained bilateral upper chest contusions which appear to have been caused by the deploying air bag. The placental abruption seems to have been caused by seat belt loading and possibly some response to her eventual movement to the right. Given that there were visible contusions to her upper chest, and none to her abdomen, it would seem likely that the air bag was not involved to any great extent.